

Claims

1. A communication adapter apparatus that connects one of plural connection object apparatuses having an apparatus object consisting of information, which is based on functions of the apparatuses, and operable control items, respectively and a network to which a controller for remotely controlling the connection object apparatus is connected, characterized by including: communication control means that controls transmission and reception of data to and from the network; apparatus communication managing means that copies and saves the apparatus object, saves a procedure for a communication service of the communication control means, and makes it possible to use the connection object apparatus from the network using these saved data; and apparatus interface means that is defined by standards common to all the apparatuses in order to make all the plural communication object apparatuses connectable.

2. A communication adapter apparatus according to claim 1, characterized by further comprising power supply managing means that manages a charged capacity inside an adapter, and in that the communication control means limits communication according to a management state of the power supply managing means.

3. A communication adapter apparatus according to claim 1, characterized by further comprising power supply managing

means that manages a charged capacity inside an adapter, and in that the apparatus communication managing means limits accesses to the apparatus object according to a management state of the power supply managing means.

4. A communication adapter apparatus according to any one of claims 1 to 3, characterized in that the apparatus communication managing means includes: an apparatus interface access unit that is usable according to a procedure common to the connection object apparatuses; and an apparatus control access unit that is usable from the communication control means according to the common procedure and also includes at least one of permitting/prohibiting means that permits or prohibits an access to the apparatus interface access unit from the communication control unit and permitting/prohibiting means that permits or prohibits an access to the apparatus control access unit from the apparatus interface means.

5. A communication adapter apparatus according to any one of claims 1 to 3, characterized in that the apparatus communication managing means includes: an apparatus interface access unit that is usable according to a procedure common to the connection object apparatuses; and an apparatus control access unit that is usable from the communication control means according to the common procedure, and each of the apparatus interface access unit and the apparatus control access unit includes at least one of object managing means that performs

management such as generation, deletion, and addition of instances and classes of the apparatus object, state acquisition procedure setting means that sets setting values held by the connection object apparatuses, a procedure for acquiring a state, a state change, a periodical notification, and the like, installation information managing means that sets and provides information on installation or arrangement of the connection object apparatuses, network attribute managing means that sets and provides attribute information concerning the network, and network band managing means that sets and provides information related to a communication band of the network.

6. A communication adapter apparatus according to any one of claims 1 to 3, characterized in that the apparatus communication managing means that, when the connection object apparatuses are not connected yet, generates an imaginary apparatus object on the basis of a setting command, transmission of which is received via the network, and saves the imaginary apparatus object instead of the apparatus object.

7. A communication adapter apparatus according to any one of claims 1 to 3, characterized in that the apparatus communication managing means includes: an apparatus interface access unit that is usable according to a procedure common to the connection object apparatuses; and an apparatus control access unit that is usable from the communication control means

according to the common procedure, and the apparatus communication managing means provides an imaginary apparatus in the apparatus control access unit on the basis of a setting command, transmission of which is received via the network, performs operation and setting for this imaginary apparatus and acquisition of a state involved in the operation and setting, and performs setting for running and stop of the apparatus object and acquisition of a state involved in the setting with the apparatus interface access unit.

8. A communication adapter apparatus according to any one of claims 1 to 3, characterized in that the apparatus communication managing means includes: an apparatus interface access unit that is usable according to a procedure common to the connection object apparatuses; an apparatus control access unit that is usable from the communication control means according to the common procedure; and a database that holds installation information for the apparatus object and the like, and each of the apparatus interface access unit and the apparatus control access unit includes writing/reading means that writes the installation information held by the database in and reads out the installation information to the connection object apparatuses.

9. A communication adapter apparatus according to any one of claims 1 to 3, characterized in that the apparatus communication managing means includes: an apparatus interface

access unit that is usable according to a procedure common to the connection object apparatuses; and an apparatus control access unit that is usable from the communication control means according to the common procedure, and each of the apparatus interface access unit and the apparatus control access unit includes: abnormality notifying means that detects in which of the apparatus interface; the communication control means; the network interface means; and the apparatus object abnormality has occurred and provides the network or the connection object apparatuses with information on the detected abnormality.

10. A communication adapter apparatus according to claim 9, characterized in that the communication adapter apparatus provides the network with the abnormality information when data transmission through the network is possible and provides the connection object apparatuses with the abnormality information when data transmission through the network is impossible.

11. A communication adapter apparatus according to claim 2, characterized in that the apparatus communication managing means includes: an apparatus interface access unit that is usable according to a procedure common to the connection object apparatuses; and an apparatus control access unit that is usable from the communication control means according to the common procedure, and the apparatus communication managing

means limits communication to the communication control means according to a state of the power supply managing means using at least one of the apparatus interface access unit and the apparatus control access unit.

12. A communication adapter characterized by comprising: an input/output interface that is connected to a home appliance; a network interface that is connected to a network; a CPU that is connected to the interfaces and performs exchange and processing of data; and a storage that saves the data, and in that the storage has plural pieces of driver software for controlling hardware of the input/output interface for each input/output system and, when the input/output interface is connected to the home appliance, the CPU distinguishes an input/output system for the home appliance on the basis of voltage information supplied from the home appliance via a specific terminal of the input/output interface and selects driver software corresponding to the input/output system.

13. A communication adapter characterized by comprising: an input/output interface that is connected to a home appliance; a network interface that is connected to a network; a CPU that is connected to the interfaces and performs exchange and processing of data; and a storage that saves the data, and in that the storage has plural pieces of driver software for controlling hardware of the input/output interface for each input/output system, the input/output interface includes a

second specific terminal that supplies a clock signal from the communication adapter to the home appliance, and the CPU starts driver software of a serial input/output system of a clock synchronous type/asynchronous type in association with supply/non-supply of the clock signal and, on the basis of a response returned from the home appliance at this point, selects driver software of the serial input/output system of one of the clock synchronous type/asynchronous type.

14. A communication adapter characterized by comprising: an input/output interface that is connected to a home appliance; a network interface that is connected to a network; a CPU that is connected to the interfaces and performs exchange and processing of data; and a storage that saves the data, and in that the storage has plural pieces of driver software for controlling hardware of the input/output interface for each input/output system, and the communication adapter selects driver software held by the storage on the basis of a communication frame that is sent from an electrical apparatus connected to the network.

15. A communication adapter characterized by comprising: an input/output interface that is connected to a home appliance; a network interface that is connected to a network; a CPU that is connected to the interfaces and performs exchange and processing of data; and a storage that saves the data, and in that the storage has plural pieces of driver software for

controlling hardware of the input/output interface for each input/output system, the storage holds attribute information consisting of items, model names, power consumption, and the like, which can be monitored, controlled, and set from the network, for each of plural home appliances, and the communication adapter selects one piece of the attribute information for the input/output interface on the basis of a response frame from the home appliance responding to the communication frame sent from the input/output interface to the home appliance.

16. A communication adapter characterized by comprising: an input/output interface that is connected to a home appliance; a network interface that is connected to a network; a CPU that is connected to the interfaces and performs exchange and processing of data; and a storage that saves the data, and in that the storage has plural pieces of driver software for controlling hardware of the input/output interface for each input/output system, the storage holds attribute information consisting of items, model names, power consumption, and the like, which can be monitored, controlled, and set from the network, for each of plural home appliances, and the communication adapter selects one piece of the attribute information on the basis of a communication frame sent from an electrical apparatus connected to the network.

17. A writing method consisting of an electrical apparatus

incorporating a nonvolatile memory in which data is rewritable when a writing control terminal is pulled down or pulled up to a predetermined voltage; and a ROM writer that writes data in this nonvolatile memory, characterized in that the electrical apparatus includes a generation circuit for generating the predetermined voltage and the ROM writer includes means that connects the predetermined voltage generated by the generation circuit to the writing control terminal.

18. An electrical apparatus constituting the writing method according to claim 17 characterized by comprising an interface that includes: the writing control terminal; and a voltage terminal that outputs the predetermined voltage generated by the generation circuit.

19. A ROM writer connected to the electrical apparatus according to claim 18, characterized by comprising an interface including means can be connected to the interface and short-circuits the writing control terminal and the voltage terminal when the means is connected to the interface.

20. A writing method consisting of an electrical apparatus incorporating a nonvolatile memory in which data is rewritable when a writing control terminal is pulled down or pulled up to a predetermined voltage; and a ROM writer that writes data in this nonvolatile memory, characterized in that the electrical apparatus has an interface including the writing

control terminal and a setting circuit for setting the writing control terminal to the predetermined voltage, and the ROM writer has an interface including trigger means that can be connected to the interface and turns ON the setting circuit when the trigger means is connected to the interface.

21. An electrical apparatus constituting the writing method according to claim 20, characterized in that the setting circuit is a circuit unit consisting of a light-receiving element that turns ON/OFF an operation for setting the writing control terminal to the predetermined voltage according to whether the light-receiving element receives light of a specific wavelength exceeding a predetermined intensity.

22. A ROM writer connected to the electrical apparatus according to claim 21, characterized in that the trigger unit is a circuit unit consisting of a light-emitting element that irradiate light of a specific wavelength on the light-receiving element.

23. An electrical apparatus constituting the writing method according to claim 20, characterized in that the setting circuit is a circuit unit consisting of a relay for turning ON/OFF an operation for setting the writing control terminal to the predetermined voltage according to whether the relay gives a specific current to a coil control line.

24. A ROM writer connected to the electrical apparatus according to claim 23, characterized in that the trigger unit

is a circuit unit including a voltage terminal that gives a specific current to the coil control line.

25. An electrical apparatus constituting the writing method according to claim 24, characterized in that the setting circuit is a circuit unit consisting of a mechanism switch that turns ON/OFF an operation for setting the writing control terminal to the predetermined voltage according to whether the mechanism switch is pushed in.

26. A ROM writer connected to the electrical apparatus according to claim 25, characterized in that the trigger unit is a projection for pushing in the mechanism switch.

27. An electrical apparatus constituting the writing method according to claim 20, characterized in that the setting circuit is a circuit unit consisting of a thermostatic lead switch that turns ON/OFF an operation for setting the writing control terminal to the predetermined voltage according to whether the thermostatic lead switch is heated.

28. A ROM writer connected to the electrical apparatus according to claim 27, characterized in that the trigger unit is a heater for heating the thermostatic lead switch.

29. An electrical apparatus constituting the writing method according to claim 20, characterized in that the setting circuit is a circuit unit consisting of a magnetic lead switch that turns ON/OFF an operation for setting the writing control terminal to the predetermined voltage according to whether

magnetism is applied to the magnetic lead switch.

30. A ROM writer connected to the electrical apparatus according to claim 29, characterized in that the trigger unit is a magnet or an electromagnet for applying magnetism to the magnetic lead switch.

31. A writing method consisting of an electrical apparatus incorporating a nonvolatile memory in which data is rewritable when a writing control terminal is pulled down or pulled up to a predetermined voltage; and a ROM writer that rewrites data in this nonvolatile memory, characterized in that the electrical apparatus includes, in an interface, the writing control terminal; switching means that switches the writing control terminal to the predetermined voltage; a signal terminal; and separating means that separates a signal inputted to the signal terminal into a data signal for writing and a trigger signal for controlling the switching means, and the ROM writer includes an interface including means that can be connected to the interface and outputs a synthesized data signal, which is obtained by synthesizing the data signal for writing and the trigger signal for controlling the switching means, to the signal terminal when the means is connected to the interface.

32. An electrical apparatus constituting the writing method according to claim 31, characterized in that the separating means includes a low-pass filter and the switching means

includes a flip-flop.

33. A ROM writer connected to the electrical apparatus according to claim 32, characterized in that the synthesized data signal is a logical product of the data signal for writing and a clock signal.

34. A ROM writer connected to the electrical apparatus according to claim 32, characterized in that the synthesized data signal is a signal in which a start bit signal and the data signal for writing are arranged in this order.